The Zoological Society.

By E. G. BOULENGER.

BEFORE the foundation of the Zoological Society of London in 1826 there was no organisation in this country devoted solely to zoological science. The Royal Society, as it still does, occasionally published papers of zoological interest, while the Linnean Society, which undertook the discussion of both zoological and botanical subjects, at this time rated the latter science of more importance than the former. As to the exhibition of living animals, during the first quarter of the nineteenth century the only collections in the country were those of the Royal Menageries at Windsor and at the Tower, and the private one of Mr. Cross at Exeter 'Change in the Strand. Hence it came about that a band of enthusiastic zoologists headed by Sir Stamford Raffles, who had just returned from administrative duties in the East Indies, decided on founding a Zoological Society in London. At the first general meeting, held in the rooms of the Horticultural Society in Regent Street, which was attended by more than a hundred persons, Sir Stamford Raffles was elected president. Unfortunately the president and founder died a few months later—some years before the society acquired its charter of incorporation, granted in 1829, in which the Marquis of Lansdowne is named as the first president of the chartered society, and Mr. N. A. Vigors the first secretary.

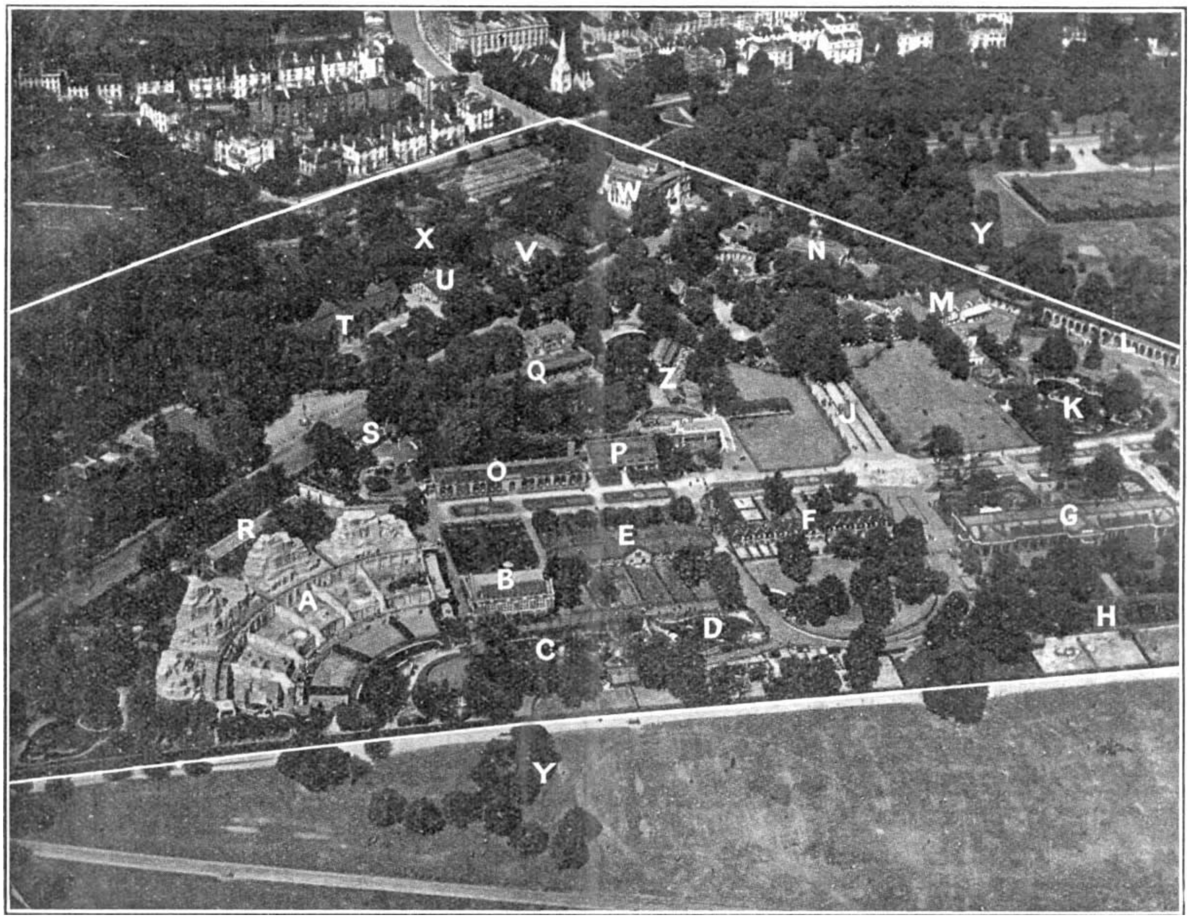
Twenty acres of ground in Regent's Park having been obtained from the Government at a nominal rent, the gardens were laid out in accordance with the plans of Decimus Burton, and opened in 1828 with a stock consisting of 152 mammals and 475 birds. The first animals to come into the possession of the society were housed at the offices in Bruton Street, where they were kept until suitable accommodation had been provided for them in the gardens. The first animal to be received was a griffon vulture, which lived in the menagerie for forty years. While the menagerie was being formed in Regent's Park the society was engaged in establishing a museum of preserved specimens in Bruton Street. The museum attracted so many donations, becoming in consequence so crowded, that in 1836 more commodious quarters were taken for it in Leicester Square. In 1843 the collections were transferred to the gardens, and housed in a building on a site now occupied by the society's offices. Indeed, in the early days of the society the museum was regarded as the centre of the society's usefulness. When, however, the zoological department of the British Museum developed, the absurdity of endeavouring to maintain an inferior collection in the same city became apparent, and in 1856 it was decided to part with the collection and present the type specimens to the national museum.

The establishment of a farm at Kingston was another of the society's early enterprises. Its object was to give accommodation to animals requiring a greater range and more quiet than the gardens in Regent's Park could afford. It was also considered necessary for the purpose of breeding, and rearing young animals, and especially for attempting to naturalise such species as were hitherto unknown in this country. This experiment was a costly failure, and was abandoned in 1836.

In the infancy of the society there were no scientific meetings, communications on subjects of zoological interest being submitted at the general meetings. In 1829 a special committee of science and correspondence was formed, at the meetings of which zoological subjects were discussed. The committee met until 1832, when an alteration was made in the by-laws by which the committee meetings were replaced by general meetings for the discussion of scientific business. These were held first at Bruton Street, but in 1843 the society moved to No. 11 Hanover Square, where it remained for forty years. In 1884 more commodious premises at No. 3 of the same square were acquired, and the meetings were held there until 1909, when the society moved to its present premises in the gardens.

The principal features of the gardens at its opening consisted of a lodge on approximately the site of the present main entrance, where visitors provided with a fellow's order paid a shilling for admission; a bear pit which still existed fifteen years ago on the site of the terrace, built in 1843; a yard for kangaroos on the site of the present eland paddock; sheds for deer and goats, and dens for large "quadrupeds"—tenanted by a lion, a tigress, a pair of leopards, a puma, a hyæna and a pair of polar bears on the site of the Lion House; a Monkey House with poles outside to which the monkeys were fastened during the summer months, on the site of the recently demolished otter pond; an enclosure for emus where the pelican enclosure now stands; paddocks for cranes and other large birds on the site of the present Eastern Aviary; an aviary for small birds, renamed the Crescent Aviary, which was demolished only last year, on the site of the new tea pavilion; and a Llama House with clock tower, the present Camel House, which alone of all the original houses and enclosures stands where it did in 1828. Just north of the Llama House was a yard with cages which housed a hybrid between a jackal and a dog, some bears, dingos, and a sable. On the site of the present Llama House were cattle-sheds containing an American bison. Towards the close of the year 1829 the tunnel connecting the south and the middle gardens (then called north garden, the present north garden being acquired at a much later date) was built, and a repository was constructed on the site of the present offices. The repository served for the reception of the animals on their arrival, and in turn has been converted into a reptile house, a museum, a small cats' house, and a squirrel house.

The gardens soon acquired great popularity, the annual admissions between the years 1830 and 1840 averaging more than 200,000. From the year 1840 the income of the society gradually decreased until in the year 1847 there were only 88,500 visitors. In that year Mr. D. W. Mitchell was appointed the first paid secretary, and with the general change of policy which he introduced matters immediately improved. To Mr. Mitchell, who held office till 1859, when he took up the directorship of the Jardin d'Acclimatation, then just founded in Paris, were due the abolition of the rule which required that all visitors should be provided with a fellow's order, and the policy of admitting the public on Mondays, and children at any time for sixpence each. On Mr. Mitchell's retirement, Dr. Philip Lutley Sclater was elected to the post of secretary, which he held until 1901. During the lengthy period that he held office many changes were effected in the gardens, the most important being the erection of the Antelope House (1861), the Eastern Aviary (1862), the Monkey House (1864), the Elephant House (1868), the Lion House (1876), the old Insect House (now the Rodent House) (1881), the Reptile House (1887), the Ostrich House (1897), the Llama House (1898), the Zebra House (1899), and the Ape House (1901), all of which are still standing and are to be distinguished on the accompanying aero-photograph. Towards the end of the year 1901 Dr. Sclater retired after serving the society for forty-three years, a period during which the society occupied a very high position in the scientific world. On his retirement his son, Mr. W. L. Sclater, held the office of secretary for a short period, but at the following annual meeting, on a vote of the fellows, the present secretary, Dr. P. Chalmers Mitchell, was elected to the post. Just prior to the retirement of Dr. Sclater some dissatisfaction had been expressed by a number of fellows with the housing conditions in the gardens, and the new secretary was soon at work, carrying out various improvements which gave immediate satisfaction to the fellows and public.



[*Photo by Central Aerophoto Co., Ltd.*

THE ZOOLOGICAL GARDENS, REGENT'S PARK, LONDON.

A = Mappin Terraces. B = Anthropoid Ape House. C = Southern Aviary. D = Sea Lions' Pond. E = Ostrich House.
F = Antelope House. G = Lion House. H = Wolves' and Foxes' Dens. J = Elephant Ride. K = Three Island Pond.
L = Birds of Prey Aviaries. M = Refreshment Rooms. N = Small Cats' House. O = Monkey House. P = Small Birds' House.
Q = Eastern Aviary. R = Western Aviary. S = Main Entrance. T = Elephant House. U = Parrots' House.
V = Caird Insect House. W = Offices and Library. X = Regent's Canal. Y = Regent's Park. Z = Clock Tower and Camel House.

Apart from realising the necessity of doing away with various small cages, and giving their inmates more exercise, Dr. Chalmers Mitchell, in spite of some opposition, insisted that many of the animals, which hitherto had been confined all the year round in very hot cages, should be given access to the open air. It was then the general belief that most of the creatures coming from the tropics should be kept very warm, and consequently their housing conditions were determined almost solely by considerations of temperature. Now visitors to the gardens in winter may see a host of tropical animals in the open, a change of policy which has had the effect of improving greatly the general health of the exhibits. The secretary also realised that in the past, when new buildings and enclosures were erected, in most cases immediate convenience took precedence of any general scheme. In 1909 he induced the council to consider the condition of the gardens with regard to existing buildings of a permanent character, and recommended that in the future, as buildings and enclosures were erected, they should be arranged in conformity with a general plan. The matter was temporarily shelved, but in 1912 the garden committee drew up a list of the animals the society could expect to exhibit under suitable conditions at any time, considered the existing accommodation, deciding how far it was to be regarded as satisfactory, and what areas should be reserved for the supply of further accommodation as it could be provided. It is in conformity with the plan then drawn up that the various buildings and open spaces provided in recent years have been erected and set out.

In 1906 and in 1907 the society obtained additional grants of land from H.M. Commissioner of Works. The 20 acres of land granted to the society in 1826 lay on both sides of the Outer Circle, corresponding roughly with the existing middle and south gardens, but only a portion to the south of the circle was laid out. In 1834 an additional plot of ten acres on the south-west border of the gardens was obtained at an annual rental, on the condition that it was to be used as pasturage. In 1839, use of the land north of the Regent's Park Canal, corresponding to the existing north gardens, was granted.

In 1841 the ground in the occupation of the society was rearranged. The strip on the north bank of the canal was surrendered, and a portion at the east end of the middle garden was exchanged for a corresponding area at the west end, and permission was given to extend the works over the ten acres granted in 1834. In 1869 the land on the north bank of the canal was again taken over by the society. A considerable portion of the north garden was, however, not made use of until after 1903, when the policy of increasing open-air facilities for the animals was put into operation. Complete use of the north garden was, however, not possible until 1906, when the right-of-way was obtained over two unoccupied portions of ground on both sides of the canal, and H.M. Commissioner of Works agreed to allow half of the new bridge over the canal to be used by the society on payment of its proportion of the cost of reconstruction. A communication between the north and the middle gardens was thus obtained. In 1907 a strip of ground was obtained along the south-west boundary of the south garden, which ends in a large triangular area at the west end, now occupied by a pond for water-fowl, and goose paddocks. The condition attached to the grant of the new piece of land was that the animals placed on it should be visible to the public in Regent's Park. The paddocks erected on this site now contain deer, llamas, emus, and rheas.

Of the buildings erected and designed under supervision of the present secretary, the Small Cats' House (1903), the Sea-Lions' Pond (1905), the Small Birds' House (1905), the Cattle and Deer Sheds (1906), the Society's New Offices and Library (1909), the Sanatorium (1909), the New Prosectorium (1909), the Mappin Terraces for the open-air display of mountain goats and bears, with its tea-pavilion (1913), the Small Mammal and Caird Insect House (1913), and the New Tea Pavilion facing the broad walk (1922), are the most important. The transfer of the offices, library, and meeting room to the gardens, apart from providing adequate accommodation for the library, which had outgrown the rooms in Hanover Square, has greatly facilitated the work of the staff. At the time there was some opposition to the transfer, a few fellows being of opinion that there would be a falling off in the attendances at the scientific meetings. Such, however, has not been the case, as at the present day they are attended far better than in the past.

How all the great improvements which have gradually been effected during the past twenty years have popularised the gardens may be best realised when we consider that the admissions, which in 1902 amounted to less than 700,000, last year exceeded 1,500,000. When the new fresh-water and marine aquarium, which the council has decided to build under the Mappin Terraces, is completed, the latter figure will no doubt be exceeded.

The Resonance Theory of Audition.

By Prof. E. H. BARTON, F.R.S.

THE resonance theory of audition continues to excite considerable interest and must be regarded as being still in the controversial stage. The very name is somewhat unfortunate and may have led some into the mistaken view that some sympathetic vibrators in the ear are postulated as capable of actual resonance or resounding like a tuning-fork set in audible vibration by another which was first sounded. Of course it should be understood, on the resonance theory, that the vibrator in question merely vibrates when a sound of nearly its own proper pitch is received by the ear, such vibration, though effecting audition by its possessor, being quite inaudible to others. Some through misunderstandings on this or other points have failed to grasp the essentials of the resonance theory of audition, and have in consequence levelled at it criticisms which clearer knowledge on their part would have obviated. No attempt will be made here to locate in the ear those mechanisms, if any, which play the part of sympathetic vibrators, responders, or resonators. That is left to the anatomists to discover. But we may note briefly the essentials of the resonance theory, the salient facts of audition and what power the theory has of meeting the demand which those facts make upon it. In the latter we may derive help from the consideration of a simple working model which any one may set up and experiment with for himself.

Essentials of the Resonance Theory.—This theory postulates the existence within the ear of some set of mechanisms, each of which has its own proper rate of vibration and rate of dying away when